

Descriptive Summary of the Changes in Coastal San Francisco Bay, California, June 9, 1986, to June 9, 1993

Grasslands dominated the landscape of the San Francisco Bay area with more than 1.7 million acres (approximately 28 percent of the land) covered by grassland. Changes from scrub/shrub, grassland, and cultivated lands constituted the greatest changes detected by the C-CAP land cover analysis in the San Francisco Bay area. It should be noted that in general the changes that occurred in the San Francisco Bay area were small in nature.

The Bay Area is one of the fastest growing economic regions in the country. Increased population density translated directly to increased pressure to develop scrub/shrub, grassland, mixed forest, and cultivated land covers, as was exemplified by the increase in the amount of land converted from these classes to urban and transitional urban areas. The largest change was a transitional conversion of more than 29,000 acres of scrub/shrub to grassland, followed closely by a conversion of 24,000 acres of cultivated land to grassland.

When forests, grasslands, and scrub/shrub are converted to low intensity development, such as residential neighborhoods, the impact to the affected land covers may be less because, typically, 20 to 50 percent of the vegetative cover remains in residential neighborhoods through the incorporation of large yards, parks, trees, and open spaces. High intensity development, such as industrial parks, parking lots, and highways, impacts these areas severely because they are no longer predominated by vegetation; rather the landscape is dominated by buildings and paved surfaces. About 31,000 acres of combined forest, cultivated land, scrub/shrub, and grassland were lost to development during the period from 1986 to 1993.

Below are three tables. The first two tables contain a data summary for the time 1 and time 2 images. These images were used to create the change image and their tables include; land cover classes, the number of pixels present in each class, and their corresponding values in acres.

The third table is a complete change matrix for time 1 and time 2 images and includes a smaller, generalized table, which groups similar classes together. Table three compares each class from time 1 to time 2 and illustrates the change that took place between classes. The table presents the total acres for each class, the total percent that each class represents, the total acres that changed, and the percent of change they represent.

Tabular Summary: San Francisco Bay, California, June 9, 1986

	CLASS	PIXELS	ACRES	PERCENT
0	Background	0	0	0.00%
1	Unclassified	0	0	0.00%
2	High Intensity Developed	846443	188244	2.94%
3	Low Intensity Developed	1798719	400024	6.25%
4	Cultivated Land	3245450	721768	11.28%
5	Grassland	8278096	1840998	28.77%
6	Deciduous Forest	165759	36864	0.58%
7	Evergreen Forest	1471513	327256	5.11%
8	Mixed Forest	1776071	394987	6.17%
9	Scrub/Shrub	2952330	656580	10.26%
10	Palustrine Forested Wetland	0	0	0.00%
11	Palustrine Scrub/Shrub Wetland	0	0	0.00%
12	Palustrine Emergent Wetland	81672	18163	0.28%
13	Estuarine Forested Wetland	0	0	0.00%
14	Estuarine Scrub/Shrub Wetland	0	0	0.00%
15	Estuarine Emergent Wetland	380428	84605	1.32%
16	Unconsolidated Shore	180911	40234	0.63%
17	Bare Land	542840	120724	1.89%
18	Water	7051959	1568313	24.51%
19	Palustrine Aquatic Bed	0	0	0.00%
20	Estuarine Aquatic Bed	1756	391	0.01%
21	Tundra	0	0	0.00%
22	Snow/Ice	0	0	0.00%
	TOTALS	28773947	6399151	100.00%

Tabular Sumary: San Francisco Bay, California, June 9, 1993

	CLASS	PIXELS	ACRES	PERCENT
0	Background	0	0	0.00%
1	Unclassified	0	0	0.00%
2	High Intensity Developed	944026	209946	3.35%
3	Low Intensity Developed	1827281	406376	6.48%
4	Cultivated Land	3119812	693827	11.06%
5	Grassland	7768232	1727608	27.54%
6	Deciduous Forest	183862	40890	0.65%
7	Evergreen Forest	1471702	327298	5.22%
8	Mixed Forest	1802314	400824	6.39%
9	Scrub/Shrub	2754780	612646	9.77%
10	Palustrine Forested Wetland	0	0	0.00%
11	Palustrine Scrub/Shrub Wetland	0	0	0.00%
12	Palustrine Emergent Wetland	72256	16069	0.26%
13	Estuarine Forested Wetland	0	0	0.00%
14	Estuarine Scrub/Shrub Wetland	0	0	0.00%
15	Estuarine Emergent Wetland	391091	86976	1.39%
16	Unconsolidated Shore	120111	26712	0.43%
17	Bare Land	656456	145992	2.33%
18	Water	7091508	1577108	25.14%
19	Palustrine Aquatic Bed	0	0	0.00%
20	Estuarine Aquatic Bed	2284	508	0.01%
21	Tundra	0	0	0.00%
22	Snow/Ice	0	0	0.00%
	TOTALS	28205715	6272780	100.00%

Change Matrix and Tabular Summary: San Francisco Bay, California, from June 9, 1986 to June 9, 1993

	FROM / TO	High Intensity Developed	Low Intensity Developed	Cultivated Land	Grassland	Deciduous Forest	Evergreen Forest	Mixed Forest	Scrub/Shrub	Palustrine Forested Wetland	Palustrine Scrub/Shrub Wetland	Palustrine Emergent Wetland	Estuarine Forested Wetland	Estuarine Scrub/Shrub Wetland	Estuarine Emergent Wetland	Unconsolidated Shore	Bare Land	Water	Palustrine Aquatic Bed	Estuarine Aquatic Bed	Tundra	Snow/ice	Total Acres	Changed	
2	High Intensity Developed	18608	133	26	28	0	0	3	14	0	0	0	1	0	0	0	25	6	0	0	0	0	186,243	235	High Intensity Developed
3	Low Intensity Developed	4181	39083	463	2568	103	1	298	1470	0	0	0	24	0	0	45	5	127	51	0	0	0	400,021	9,338	Low Intensity Developed
4	Cultivated Land	1183	3122	877288	23835	213	113	1051	5499	0	0	0	687	0	0	119	40	7170	551	0	0	0	726,789	43,626	Cultivated Land
5	Grassland	16524	9914	12453	166356	1734	1623	2897	5289	0	0	0	1234	0	0	1696	830	16035	1077	0	19	0	1,733,862	78,692	Grassland
6	Deciduous Forest	0	1	0	42	36764	1	19	14	0	0	0	4	0	0	0	0	0	19	0	0	0	36,864	100	Deciduous Forest
7	Evergreen Forest	5	73	9	359	179	321467	3154	1992	0	0	0	2	0	0	1	0	14	1	0	0	0	327,256	5,788	Evergreen Forest
8	Mixed Forest	65	189	514	1662	435	884	370482	2892	0	0	0	150	0	0	223	12	139	11	0	0	0	377,655	7,173	Mixed Forest
9	Scrub/Shrub	244	1823	1658	29199	1418	2968	22728	594887	0	0	0	148	0	0	82	13	1321	92	0	0	0	656,686	61,693	Scrub/Shrub
10	Palustrine Forested Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Palustrine Forested Wetland
11	Palustrine Scrub/Shrub Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Palustrine Scrub/Shrub Wetland
12	Palustrine Emergent Wetland	5	103	79	1454	6	2	63	90	0	0	12639	0	0	2702	177	95	744	0	1	0	0	18,160	5,520	Palustrine Emergent Wetland
13	Estuarine Forested Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Estuarine Forested Wetland
14	Estuarine Scrub/Shrub	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Estuarine Scrub/Shrub
15	Estuarine Emergent Wetland	102	281	207	2519	7	2	14	32	0	0	339	0	0	78218	942	207	750	0	4	0	0	84,605	5,387	Estuarine Emergent Wetland
16	Unconsolidated Shore	43	3	1035	126	0	0	1	0	0	0	8	0	0	436	19316	147	19060	0	57	0	0	40,234	20,918	Unconsolidated Shore
17	Bare Land	144	59	82	2388	1	0	0	115	0	0	0	2	0	0	8	23	117641	131	0	0	0	120,595	2,954	Bare Land
18	Water	503	10	38	76	26	34	114	372	0	0	831	0	0	2443	5352	2859	1554610	0	261	0	0	1,567,531	12,921	Water
19	Palustrine Aquatic Bed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Palustrine Aquatic Bed
20	Estuarine Aquatic Bed	1	0	0	1	12	7	0	0	0	0	0	0	0	0	0	0	213	0	166	0	0	391	226	Estuarine Aquatic Bed
21	Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Tundra
22	Snow/ice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Snow/ice
Total Acres		209,948	406,376	693,828	1,727,608	40,890	327,298	400,823	612,646	0	0	16,069	0	0	86,976	26,712	145,992	1,577,103	0	508	0	0	4,718,164		Total Acres
Percent of Total		4.46%	8.61%	14.71%	36.62%	0.87%	6.94%	8.50%	12.98%	0.00%	0.00%	0.34%	0.00%	0.00%	1.84%	0.57%	3.09%	33.43%	0.00%	0.01%	0.00%	0.00%			Percent of Total
Total Acres that Changed (Y2-Y1)		21,702	4,356	-26,961	-6,244	4,026	43	23,168	-43,524	0	0	-2,991	0	0	2,371	-13,522	26,397	9,873	0	117	0	0	246,281		Total Acres that Changed
Percent Change		11.53%	1.09%	-3.74%	-0.36%	10.92%	0.01%	6.13%	-6.89%	0	0	-11.51%	0	0	2.89%	-33.61%	21.96%	0.61%	0	38.87%	0	0	5.22%		Percent Change

FROM / TO	Developed	Cultivated	Grassland	Forested	Scrub/Shrub	Wetlands	Bare	Water	Total Acres	Changed	
Developed	583,068	406	2,566	405	1,484	73	157	59	586,264	5,269	Developed
Cultivated	4,247	677,284	23,835	1,377	5,659	806	7,219	551	729,789	43,526	Cultivated
Grassland	25,438	12,453	1,663,389	6,452	5,269	2,930	16,865	1,077	1,733,833	79,483	Grassland
Forested	329	524	2,063	733,385	4,868	380	165	31	741,774	8,390	Forested
Scrub/Shrub	2,068	1,659	29,199	27,114	594,887	230	1,335	92	656,686	61,693	Scrub/Shrub
Wetlands	471	267	3,974	93	122	85,068	1,633	1,494	103,136	6,974	Wetlands
Bare	245	1,116	2,514	3	115	512	137,127	19,191	160,828	23,791	Bare
Water	514	38	2,388	175	372	3,535	8,211	1,554,610	1,568,842	15,232	Water
Total Acres	616,320	693,828	1,729,918	769,003	612,646	103,626	172,703	1,877,103	4,718,164	236,357	Total Acres
Percent of Total (Y2/Total)	13.06%	14.71%	36.62%	16.30%	12.88%	2.19%	3.66%	33.43%		5.01%	
Total Change (Y2-Y1)	26,686	-26,961	-3,916	27,229	-43,523	389	11,876	7,261		236,357	
Percent Change	4.77%	-3.74%	-0.23%	3.67%	-6.89%	0.39%	7.38%	0.46%		5.01%	